

# Multimodal Arterial Performance Management Regional Concept of Transportation Operations (RCTO)

ODOT  
Transportation  
Engineering  
Conference

September 24,  
2013

Portland Multimodal Arterial Performance Management  
implementation guidance document

February 2013

Prepared for  
ODOT METRO

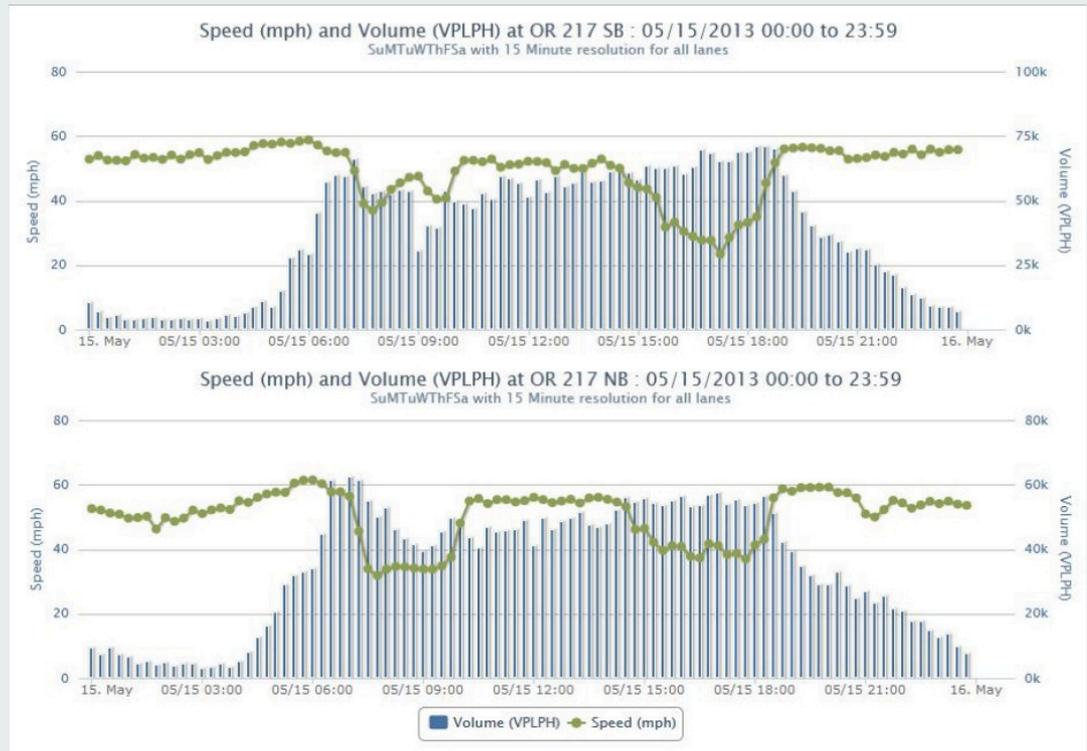
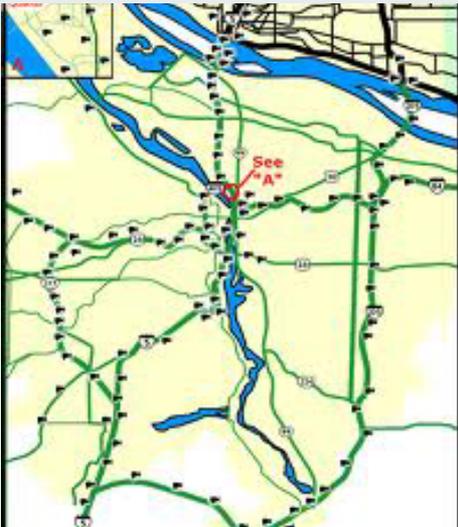
Prepared by  
DKS

In cooperation with  
KITTILSON & ASSOCIATES, INC.  
TRANSPORTATION ENGINEERING/PLANNING



# Why arterial performance measures?

Ample freeway data available → Bridging the gap and need for arterial roadway data.



# Why arterial performance measures?

- Regional policy to deliberately manage the transportation system
- 2010 Portland Metro TSMO plan identified this Arterial Performance Management RCTO as a 1<sup>st</sup> Step towards the 10 year vision.

**Goal 4: Emphasize effective and efficient management of the transportation system”**  
- 2035 RTP

**“Increased transparency of the transportation analysis and decision making”**  
- 2035 RTP, Chapter 5



# Vision for Collecting Multimodal Arterial Performance Measures

Improve transportation operations

Inform transportation modeling tools

Learn from implementation projects

Support investment decisions (MAP-21)

Facilitate traveler's transportation choices



# How'd We Decide Which Arterial Performance Measures to Track?

- **AUTOMATION IS KEY!**  
Entire process from collecting to reporting must be fully automated
- Ensuring data from all modes of travel on arterial roadways are represented
- Prioritizing performance measures based on stakeholder feedback
- Technology must be currently feasible



# Which **Automated** Performance Measures Are We Tracking?



## **Bike/ Pedestrian**

- Bike Volumes & Ped Actuations
- Delay



## **Transit**

- Travel time
- Speed
- Delay
- Passenger volumes



## **Auto/Freight**

- Travel time, speed, delay
- Volumes, classification



## **System Performance**

- Intersection Operations
- Detector Health
- Air Emissions

**Multimodal Performance Measures**

# Why is Safety/Crash Data not included?

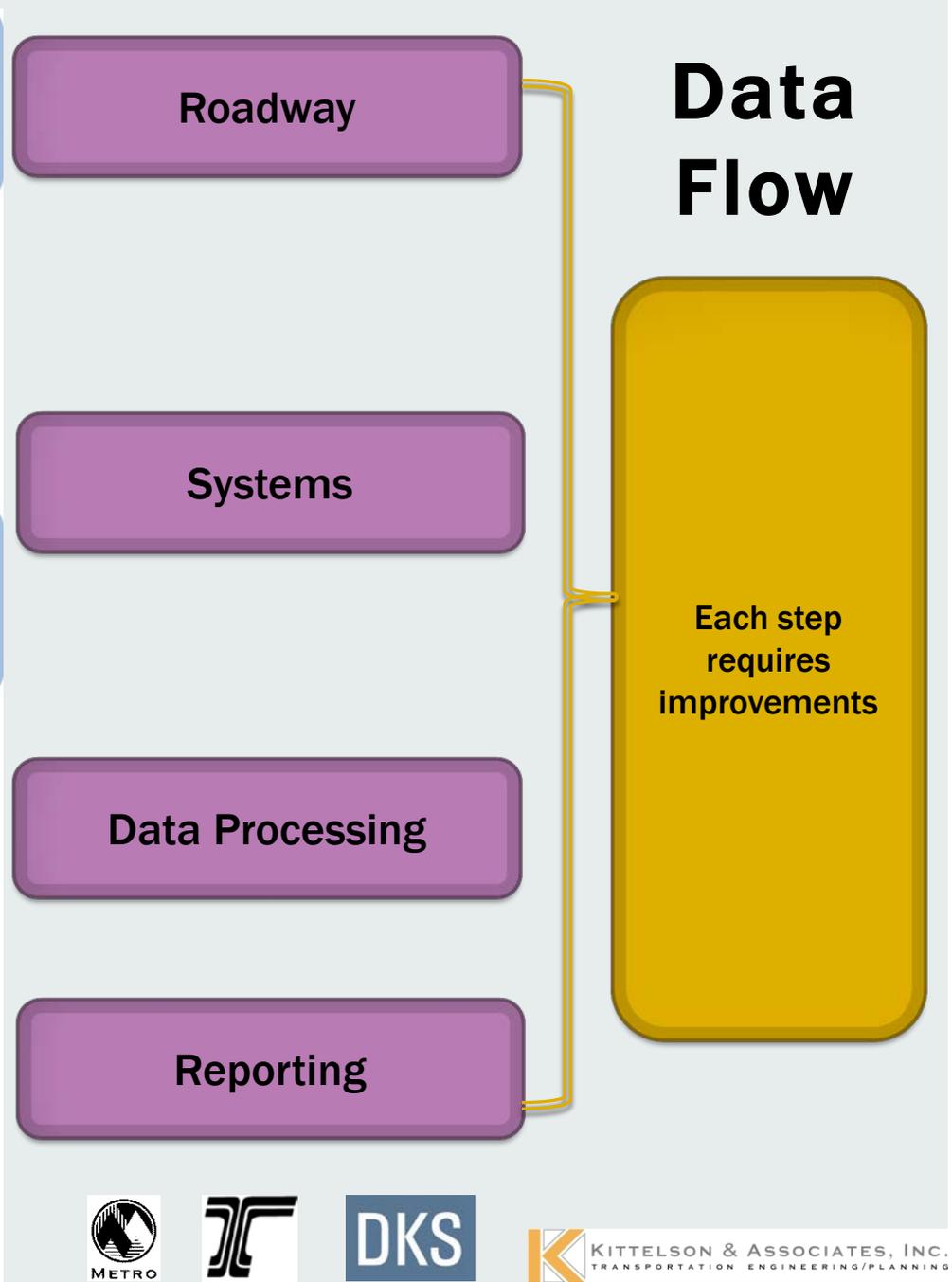
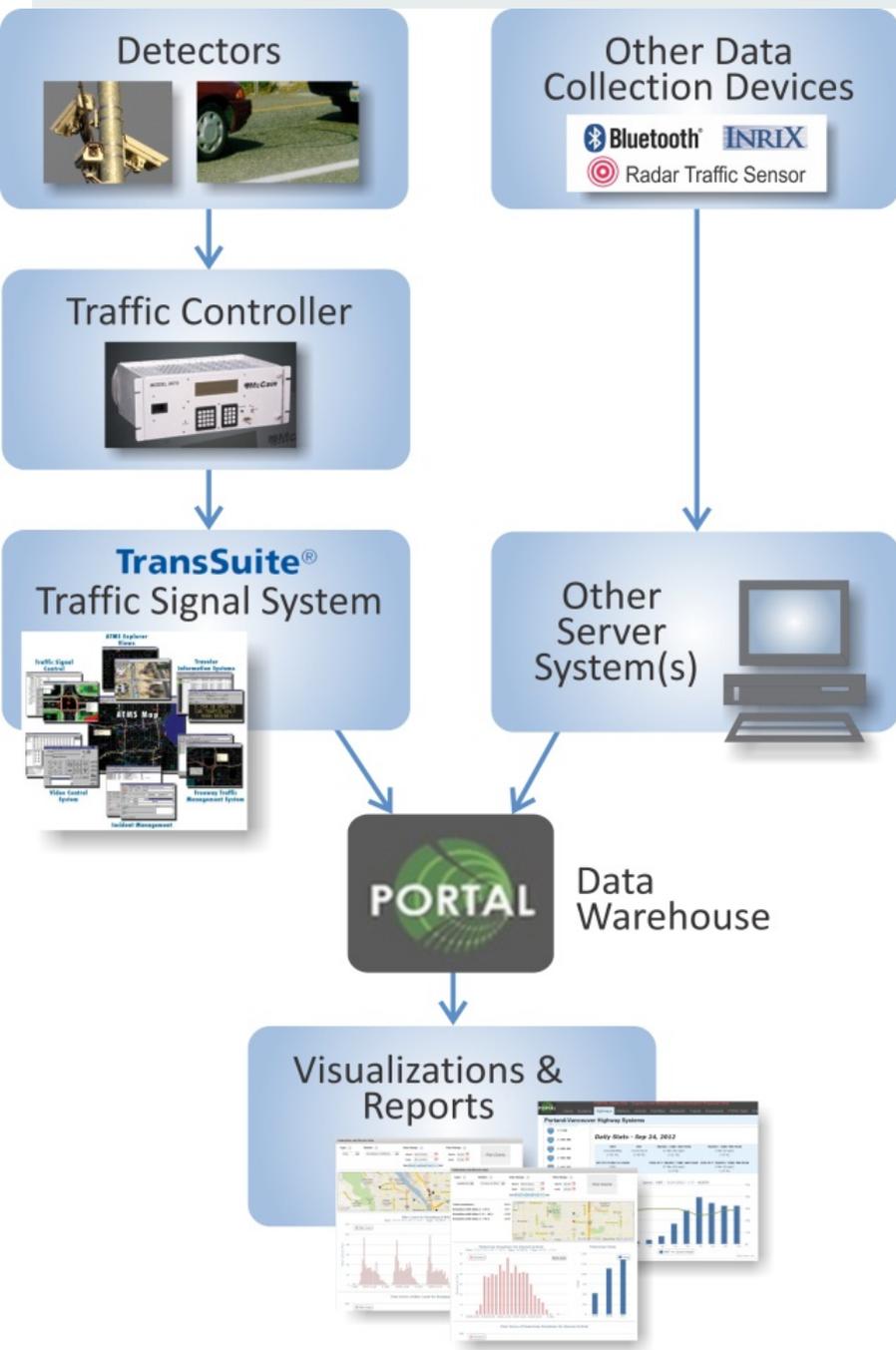
- Hard to automate at this point in time
- Potential to add in the future (via connected vehicle technology)



- Safety performance measures could include:
  - Number of traffic fatalities
  - Number of serious injuries in traffic crashes
  - Number of bicycle or pedestrian related fatalities and serious injuries
  - Fatalities per VMT
  - Number of red-light running related crashes
  - Number of speed related crashes

# How will we achieve this Vision?





# What improvements are necessary to achieve our vision?

## Roadway Improvements

Install necessary detection

Maintain and monitor detection



## System Improvements

Update traffic signal controllers as needed

Update traffic signal software

Update other server systems



## Data Processing Improvements

Automate data upload to PORTAL

Create an automated data validation process

Improve the data archive and transform process

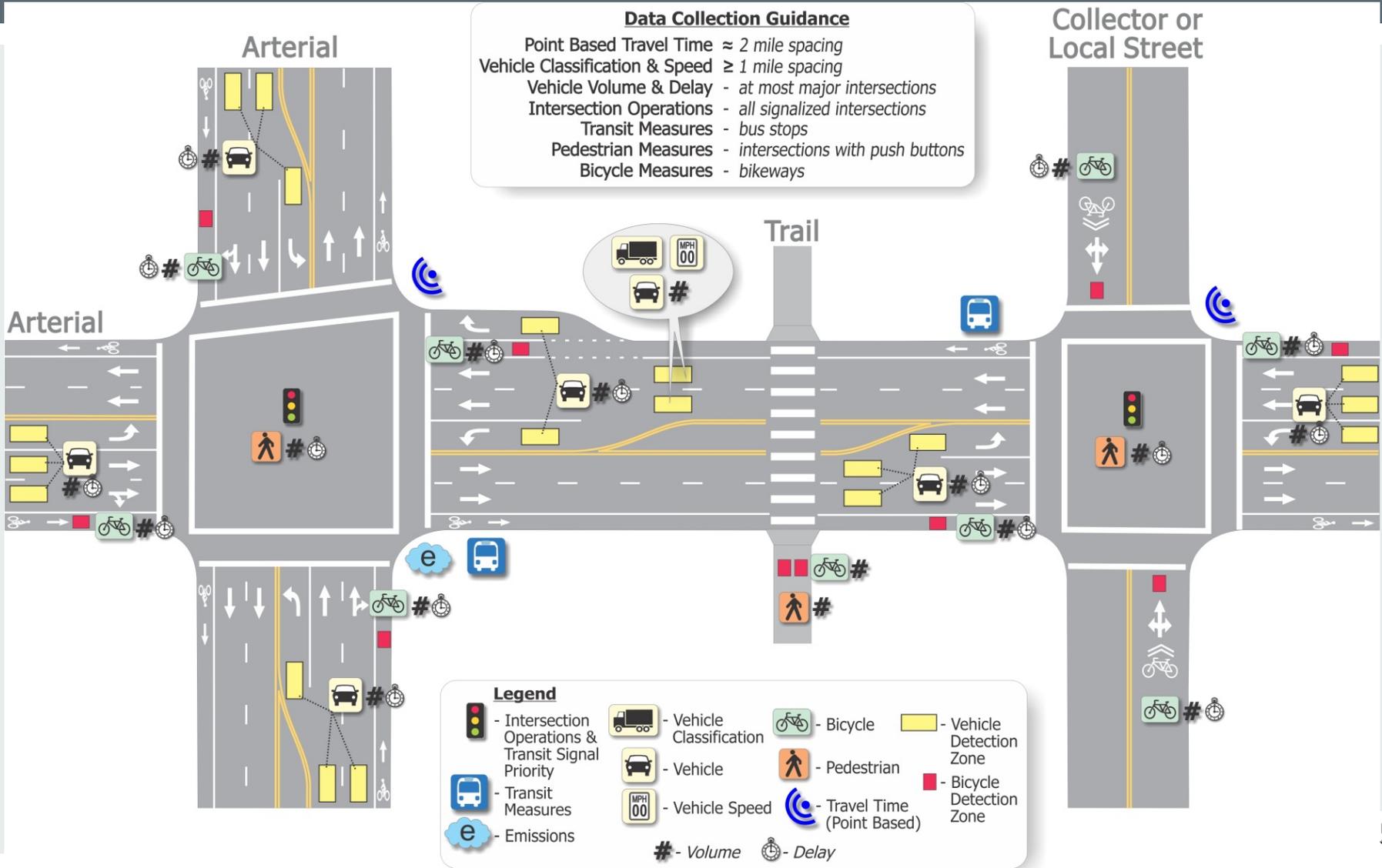


## Reporting Improvements

Upgrades to PORTAL



# Where Should I Install the Data Collection Equipment?



# Improvements Currently In-Process

- **PORTAL Upgrades**
- **Traffic Signal Controller Software Improvements**
- **Acquisition of statewide INRIX Data (no integration planned with PORTAL)**



# Responsibilities

Agency	Role and Responsibility
<b>Portland State University</b>	<ul style="list-style-type: none"><li>• <b>Manage PORTAL</b></li><li>• <b>Automate data upload from data collection servers/systems</b></li><li>• <b>Provide raw and aggregated data for download</b></li><li>• <b>Generate data summaries and visualizations</b></li><li>• <b>Create annual state of the region performance measures report</b></li></ul>
<b>City of Portland/ ODOT</b>	<ul style="list-style-type: none"><li>• <b>Manage data collection servers/systems such as TransSuite</b></li><li>• <b>Plan, install, operate, and maintain field equipment on agency owned facilities</b></li><li>• <b>Manage local controllers and servers</b></li><li>• <b>Send information to TransSuite and PORTAL</b></li></ul>
<b>Local Agencies</b>	<ul style="list-style-type: none"><li>• <b>Plan, install, operate, and maintain field equipment on agency owned facilities</b></li><li>• <b>Manage local controllers and servers</b></li><li>• <b>Send information to TransSuite and PORTAL</b></li></ul>
<b>Transport</b>	<ul style="list-style-type: none"><li>• <b>Oversee the annual state of the region report created by PORTAL</b></li></ul>

# How Will Daily and Annual Agency Roles Change

- Update agency standards to reflect regional performance measurement requirements (recommendations in RCTO report)
- Potential increase in equipment maintenance requirements to ensure properly functioning field detection equipment

**Important Discussion for Agencies**



# Action Plan and Responsibilities

Time Frame	Actions	Responsible Party
Near Term	Upgrade NWSVoyage capabilities and modify ODOT traffic signal cabinet standard to enable additional inputs. - <b>IN PROCESS</b>	ODOT
	Automate data collection (see report).	Agencies
	Update design standards (see report).	Agencies
	Implement demonstration project and validate data from demonstration project. - <b>COMPLETE</b>	PBOT
	Upgrade TransSuite capabilities to automate data transfer to PORTAL - <b>IN PROCESS</b>	PBOT
	Implement software updates to SCATS (and other signal software as necessary) to allow PORTAL to access performance measures.	PBOT
	Implement PORTAL upgrades (see report). - <b>IN PROCESS</b>	PORTAL
	Validate the data (ongoing).	PORTAL/ Agencies
	Produce an annual State of the Region Report	TransPort
	Provide guidance to agencies regarding recommended updates to standard plans. - <b>COMPLETE</b>	PMT
Provide direction that will prioritize criteria and identify corridors for deployment of future arterial performance measure projects - <b>COMPLETE</b>	Stakeholders	

# Practical Application – Story of 82<sup>nd</sup> Avenue



# Objectives of Demonstration Project

- Demonstrate that useful data can be collected
  - Variety of sources
  - Across modes (multi-modal)
  - Cost-effective (automated)
- Data provides useful information to end-users
- Identify gaps, needs, and lessons learned for future implementations



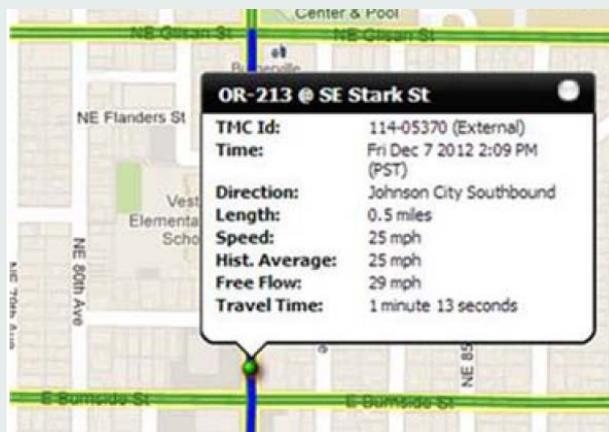
# 82<sup>nd</sup> Avenue Existing Features

- 2070 Controllers w/Voyage™
- Communications & TransSuite
- Permanent Bluetooth™ Readers
- System Detectors (Volume)
- TriMet Data (AVL, APC)
- Arterial VMS
- Air Quality Monitor (Powell)
- Weather Station



# 82<sup>nd</sup> Avenue Added Features

- Springwater Trail Bike Loops
- Modified System Detectors (Speed & Length)
  - Fremont/82<sup>nd</sup>
  - Burnside/82<sup>nd</sup>
  - Flavel/82<sup>nd</sup>
- Inrix<sup>TM</sup> Travel Time & Speed



# Results & Lessons Learned

- Variety of useful multi-modal arterial performance data can be collected
- Need for data to be centralized with query features
  - NWS Voyage → TransSuite → PORTAL; enhancements needed
  - TransSuite UCM → TransSuite TCS

cord 1	Detector #	1	2	3
Date	Friday, August 31, 2012	Volume 56	164	42
Time	16:30	9	10	11
Period	60	625	724	0
		17	18	19
		71	0	513
		25	26	27
		608	0	371

Detailed Info Timing Timing Plans Dets Failures Time Consistency Comm Test Comm Data Split Logger Vol/Occ

Active	Start Time	End Time	Term Time	Int Descr	Starting Cycle Len	Star
yes	05/25/2013 06:50:30	none	01/19/2018 14:11:01	NE 82nd @ Fremont	75	

Quick Report

Phase Times Timing Plans

Start Date/Time

5/27/2013

7:09:33 AM

End Date/Time

5/28/2013

7:09:33 AM

Generate Report

Clear Report

Page Size: 8 Update

Page: Go Page 1 of

| << < > >> |



Cycle #	End	Plan	Timing	Ph 1	Ph 2	Ph 3	Ph 4
1227006	05/27/2013 07:10:19	2	coordinated	016/000/000	---/040/065	000/000/000	032/031/074
-	-	-	-	-	-	-	-
1227007	05/27/2013 07:11:39	2	coordinated	016/000/000	---/040/065	000/000/000	032/031/074

# Results & Lessons Learned

- Care with detector placement

- Bluetooth generally 1 mile + spacing
- Springwater Trail → out of direction bike travel
- System detectors → avoid congestion for accurate data



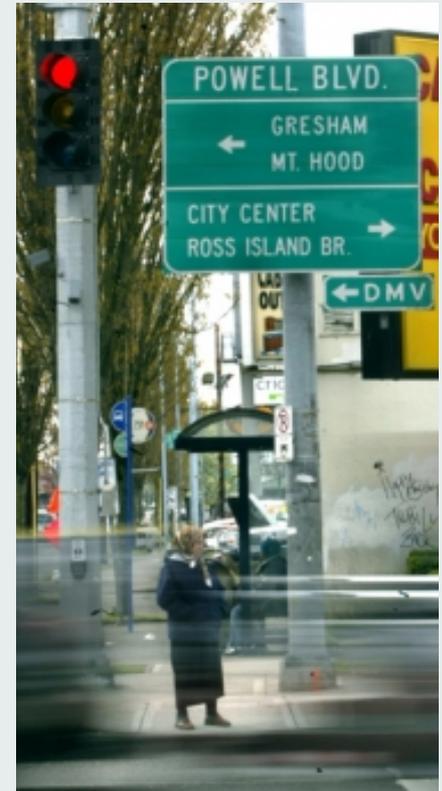
<http://www.worldcarfans.com/10804011672/new-york-city-congestion-charge-approved/highphotos#0>



# Results & Lessons Learned

- Understand limitations in data collected
  - Pedestrian # of service and delay based on actuation...push both buttons?
  - Out of direction travel
  - Stuck on or broken detection

71	Record Number	1335				Sample Period	60			
72	Date	Wednesday, May 02, 2012				Mid - Period Time	07:30			
73		Phase	1	2	3	4	5	6	7	8
74	Phase Service	5	36	0	36	3	36	0	36	
75	Ped Service	0	3	0	1	0	1	0	1	
76	Average Green	6	71	0	18	7	72	0	18	
77	Max Outs	0	0	0	2	0	0	0	3	
78	Force Offs	0	17	0	0	0	26	0	0	
79	Gap Outs	5	19	0	34	3	10	0	33	
80										
81	Record Number	1336				Sample Period	60			



Presented

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